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Are not such cases as these proofs that aqueous vapour is a most important agent in conveying heat, which, when liberated from its chemical union with water, extensively modifies climate? To such an agent we may attribute the generally mild winter-climate of the British islands.

X.—*Remarks on Serpent Island.* By CAPTAIN T. SPRATT,
C.B., H.M.S. Medina.

Communicated by the LORDS COMMISSIONERS of the ADMIRALTY.

Read, June 8, 1857.

See Admiralty Map of 1857.

THIS little island, independent of the question of right, formerly in dispute, has several points of interest peculiar to it. First, from its local position, as the eye of the Danube; and also from being the only real island, small as it is, in the Black Sea, deserving the appellation.

Nature thus seems to have placed it there on purpose to be a beacon or shield for the approach to the low shore and shallows that extend from the mouths of this great European river, the delta of which has a sea-coast of the same low character of more than 50 miles in extent, and nowhere 2 feet above the sea.

By its mineralogical character also it is peculiar, since it cannot be claimed or be said to be a part of either the Dobrutcha or Bessarabia from any identity of their approximate coasts. Neither can the Danube claim it as a creation from its deposits. The composition or geological character of its rocks show that it is a fragment of the older group of strata which form the mountains surrounding the south-western division of the Black Sea, Bulgaria, &c.; and it thus appears to be an outlying peak or fragment of the schistose group of rocks that occur in the north part of the Dobrutcha, near Besh Tepeh and Toultscha; for it is composed of siliceous strata, containing large crystals of quartz, and passes sometimes into red jasper. The strata are separated by thin bands of friable shale, and attain a thickness of nearly 200 feet, their dip being from 10° to 20° to the E., and the height of the island 130 feet above the sea.

From this description of the nature of the island it is thus evident that it has no connexion with the low, flat country of Bessarabia, as I have heard it often stated. For this coast, and also the interior of the country, as far as could be seen from the Medina's masthead, anchored off it, appears not to be 20 feet above the sea anywhere, and to be composed of the earthy marl, which forms the surface of the level steppe generally. Indeed, the coast of Bessarabia to the N. of Serpent Island is hardly above

the level of the vegetation (reeds and rushes) which grow on the delta of the Danube, and thus appears from sea as a part of it.

From its antiquarian associations Serpent Island has also some interest, for the Hellenes believed that Achilles made this his final abode; and a temple of some celebrity existed on the island dedicated to that god and hero.

The accompanying plan of the island and view shows that it is about one mile in circumference, and surrounded for the most part by precipitous cliffs from 60 to 100 feet in height, with deep water near their base.

The island is nearly of the shape of a triangle, but with one of its angles prolonged into a small, level promontory, about half the greatest elevation of the island. This little promontory has a landing-place on either side of its neck, on a beach of large shingle, with a road or path cut through the cliff or bank on the north side; but on its side, where the landing is better, there are remains of a terraced road, formed of rude blocks, which are of a Cyclopean style, and evidently of a very early date. On reaching the top of this promontory the interest in its antiquarian association is more fully awakened on seeing its surface almost composed of fragments of ancient pottery,—pieces of vases, patera, and amphore lying in great profusion, and the ground in such a condition as to show that not many years since the entire surface has been dug over in search of these and other relics. But the pottery appears to have been wantonly destroyed, as being little appreciated in a search that was most likely made for articles of more intrinsic value—coins, &c. After a little search among the heaps of pottery, I found several fragments with parts of Greek inscriptions upon them, which had been both stamped when the clay was soft, and also scratched on the surface after being hard, and painted. Some of the paintings were in black and others in red, being figures of animals and ornamental designs, but none entire, yet forming parts of very elegant vases and patera when perfect, and indicated an early occupation of the island. There were fragments of glass and brazen vessels also among the heaps of broken pottery. The handles of large jars, apparently for water, were so plentiful, that they indicated the existence of a settlement or collections of habitations on this little promontory, as well as its having vestiges of buildings; but none of the character of a temple, which must have stood upon the summit of the island, where are still lying several squared blocks of marble 4 or 5 feet in length, one of which had some, almost illegible, Greek characters; and two or three others, which had mouldings, seem to have formed the slabs of a small pediment, and are, I think, vestiges of the temple of Achilles.

On the western part of the island there are also more evidences of the very early occupation of the island, the surface being inter-

sected with the foundations of long walls, formed of rude blocks, that bear an Hellenic type, and seem to have formed divisions of property when it was entirely cultivated, for the surface of the island is for the most part formed of a rich, black earth, 2 and 3 feet deep. There are also some evidences of detached buildings of the same character, and three very ancient wells.

These remains evidently indicate an occupation of the island at the earlier period of Greek history, and lead to the idea that it may have been occupied as a trading depôt by some Hellenic community that traded with the Danube and the adjacent low country, the distance from the coast rendering it safe from the insalubrity of the marshy delta and from molestation of the natives. For it is by nature almost formed into an impregnable sea-fortress for such a depôt, and by its elevation was a beacon or landfall for the adjacent coast to the bold navigation seeking for it in those days.

The fullest account of the island in ancient times is given by Arrian in his '*Periplus of the Euxine*,' or rather in a letter addressed to the Emperor Hadrian, detailing a voyage round the Black Sea, from which I make the following extract:—

"Thetis is said to have given up the island to her son Achilles, by whom it was inhabited. There are now existing a temple and a wooden statue of Achilles, of ancient workmanship. It is destitute of inhabitants, and pastured only by a few goats, which those who touch here are said to offer to the memory of Achilles. Many offerings are suspended in this temple, as cups, rings, and the more valuable gems. All these are offerings to the memory of Achilles. Inscriptions are also suspended, written in the Greek and Latin languages, in praise of Achilles, and written in different kinds of metre. Many birds inhabit this island, as sea-gulls, divers, and coots innumerable. These birds frequent the temple of Achilles every day; in the morning they take their flight, and having moistened their wings, fly back again to the temple, and sprinkle it with the moisture, which having performed they brush and clean the pavement with their wings. This is the account given by some persons. Those who come on purpose to the island carry animals proper for sacrifice with them in their ships, some of which they immolate, and others they set at liberty, in honour of Achilles. Even those who are compelled by stress of weather to land upon the island must consult the god himself whether it would be right and proper for them to select for sacrifice any of the animals which they should find feeding there, offering at the same time such a recompense as to them seems adequate to the value of the animal so selected. But if this should be rejected by the oracle—for there is an oracle in this temple—they must then add to their valuation, &c. A considerable treasure is thus laid up in this temple as the price of these victims."

The existence of this temple to Achilles caused the island to be also called Achilles by some ancient authors, and Leuce from its light colour, by others; and, although Arrian says it was uninhabited in the time of Hadrian, there is no doubt, from the remains upon it, that it was inhabited at an earlier period, and probably in the first instance for the objects I have noted.

The modern name of Fido Nisi, or Serpent Island, has no doubt arisen from these animals having multiplied upon the island

since its desertion; and they are still very numerous, being veritable sea-serpents or water-snakes, that live upon the fish in the sea and inhabit the cliffs of the coast. More than twenty were seen coiled together under a shelving rock that received the rays of a warm October sun; and many having fallen into the wells and cisterns, and died there, the water in them is not now drinkable; so that water for the Turkish troops is obliged to be brought from the Danube. The serpents are jet black, except along the abdomen, which is whitish; they have a small head, and are from 4 to 5 feet long, and, although said to be harmless, are a very disagreeable-looking species.

The lighthouse now standing upon the summit of the island was erected by the Russians, and is built of brick imported for the purpose. the tower is 50 feet high, and now shows a beautiful revolving light of the second order, which has been recently placed on it by the Turkish government, and was first exhibited on the 15th of October.

This account of Serpent Island, which recent events connected with its disputed occupation by Turks and Russians render of some interest, leads to the consideration of the utility of this island, and perhaps from that the strongest claimant on grounds of real local interest.

It has been shown that if territorial identity be in any way considered a point of right, that right is more in favour of Bulgaria on the Dobrutcha than of Bessarabia. The delta of the Danube is, however, its proximate shore, from which it is distant about 24 miles, being equally distant from the mouth of the Kilia and from Sulina, but actually visible from neither, although the lights of Sulina and Serpent Island may often be seen from each other.

There can be no doubt but that the existence of this rock so immediately off the mouths of the Danube has been a great advantage to vessels bound for the river; for the island being high and bold it can be approached without danger. A vessel thus arriving during a N.E. gale, when the river cannot be entered, may anchor under the island in the summer season, or lie to, on and off, merely keeping the island in sight, so that when the weather is at all favourable she can shape a course with certainty for the river, and thus take advantage of the first favourable moment for entering.

Serpent Island is thus the eye and shield of the Danube, for it is the seaman's beacon or safeguard against falling upon the shallows of the low coast, when, from the influence of currents and the absence of observations for several days, as is usual in N.E. winds, he would, from the uncertainty of his reckoning without such a beacon, either lose much time by keeping too great an offing, or be embayed or stranded on a lee-shore, through ap-

proaching it too close at an unfavourable moment, from ignorance of its true position, until too late to be avoided.

When the *Medina* anchored off the s.w. point of Serpent Island at the close of a N.E. gale, she found four vessels lying under shelter of the island, at about one cable from the shore, in 12 and 15 fathoms. The bottom is fair holding ground in that depth all round the island, and seems to consist of mussel-shells and mud, into which the anchor sinks. Arrian mentions that the island was a refuge for the mariner in stress of weather in the earliest days. Thus it is evident that, by the addition of a light upon it, the island is rendered doubly valuable to the navigation and trade with the Danube, and to this trade therefore the island is of special use and importance. It is true that vessels bound for Odessa may benefit by this light in rectifying their course; but to that trade it is not so much a necessity as to the Danubian, because Odessa has a high coast on either side, and has its sea-warning in the advanced and elevated light upon Cape Fontana in addition to its port lights. Therefore it is clear that to the trade of Odessa Serpent Island is not a necessity, although sometimes serviceable; for it must be borne in mind, in considering this question, that Serpent Island is not a danger, but Nature's sea-beacon, being high and bold, and by the addition of the light the position of the beacon is merely made as visible by night as by day at the greatest possible distance.

XI.—*Hydrography of the Valley of the Arve.* By Professor PAUL CHAIX, of Geneva, Corresponding Member of the Society.

Communicated by the SECRETARY.

Read, June 8, 1857.

HAVING last year given some time and care to the study of my country, under an hydrographical point of view, I collected as many of the existing documents as I could procure, and attempted to add to the scanty stock, some observations of my own on the basin of the Arve. Although, strictly speaking, that river flows mostly through the Sardinian territory, I thought it was too closely connected with Switzerland to be neglected, especially as it is more directly within my reach.

The river Arve is the most considerable of the Alpine tributaries of the Rhone, more from its size than from the extent of country it drains, which covers an extent of 385 square miles on the northern or right side of the river, and 386 on its left or southern bank; being a total of 771 square miles. Its boundary line winds along the crest of mountains over a length of 64 miles on the northern side and 93 on the southern. Of the total surface of the basin, 82 square miles are covered with glaciers and constant snows.

The number of tributaries is 16 on the right side and 17 on the